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ABSTRACT

This paper presents an annotated bibliography of 69 articles published in the 1990s that examine the impact of technology on reference service in public, school, and academic libraries. The paper is organized in the following seven parts, each dealing with a different type of application of technology: (1) "General Change Caused by Technology"; (2) "Formats of Reference Information," including CD-ROMs, geographic information systems, graphics, vertical files, and the World Wide Web; (3) "Remote Delivery of Information"; (4) "Use of Remote Resources in the Reference Transaction"; (5) "Reference Collection Development"; (6) "Connecting Reference Librarians to Remote Users," including e-mail, multi-user object oriented, videoconferencing, and Web forms; and (7) "Miscellaneous," including attitudes and behavior, professional collaboration, scheduling, and instruction. Each part begins with a brief overview that gives history, definition, or details on major issues. Several observations are offered about the literature of the 1990s in regard to technology and its effect on reference services. (MES)

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Technology and Reference Changes in the 1990's:

An annotated bibliography

Russell F. Dennison

April 24, 2000

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INTRODUCTION

The primary purpose of this paper is to examine the impact of technology on reference service in libraries. Libraries are defined as public, school and academic libraries. This will be done by collecting and by annotating the relevant articles published during the last decade. Although libraries adopted new technologies earlier than 1990, this last decade had more technological advances than earlier decades. Some of the advances include Web-based online public access catalogs (OPACS), patron initiated interlibrary-loan (PILL), online databases, email reference service, and interactive television (ITV) reference service.

Technology can be identified in many ways. For this paper, technology is defined as being the use of electronic devices, such as computers and television. The definition of reference service is slightly restricted as well. Instructional programs are not included in this use of reference service, although in many libraries instruction is a function of the reference department. Instruction delivered on demand to single individuals at the reference desk will be considered. Otherwise, reference service as used here is either the interaction of the reference librarians with patrons (in-person or remotely, synchronously or asynchronously) or the preparation for or evaluation of that interaction. Collection development was not included unless the item specifically dealt with collection development of the reference collection. Articles merely reviewing or making recommendations for reference collection development were also not included.

This bibliography is not comprehensive; however it is the result of multiple searches (both multiple terms and at different times) of *Library Literature* and *Educational Resources Information Center* (*ERIC*). Footnotes and bibliographies from the 1990's that were cited in any entry on this list were also investigated. Not all

identified items were included. Any work outside the field of librarianship was excluded. Only English language materials were investigated.

This paper is organized into seven parts. Each part deals with a different type or application of technology. The seven sections are: General Change Caused by Technology; Formats of Reference Information; Remote Delivery of Information; Use of Remote Resources in the Reference Transaction; Reference Collection Development; Connecting Reference Librarians to Remote Users; and Miscellaneous. Each part begins with a brief overview that may give some history, definitions or details on major issues. Some of the pieces of literature deal with more than one technology or application. However the primary focus was used for placement into the parts. Cross-references were added for the secondary foci.

ABBREVIATIONS

ARL -- Association of Research Libraries

BBS -- Bulletin board service

CARL-- Colorado Alliance of Research Libraries

CD-ROM -- Compact disk, read-only-memory

ERIC -- Educational Resources Information Center

FTP -- File transfer protocol

GIS -- Geographic information system

GUI -- Graphic user interface

IPL -- Internet Public Library

ITV -- Interactive television

LAN -- Local area network

MOO -- Multi-user dialog object oriented

OPAC -- Online public access catalog

URL -- Uniform resource locator

WWW -- World Wide Web

GENERAL CHANGE CAUSED BY TECHNOLOGY

This section deals with generalities. The articles listed discuss general change in reference services as a result of technology. If an article reports on only one particular service or technology tool, then that article was placed into one of the other sections. If an article focused solely on using email to communicate with other reference librarians, then that article would be listed in the Professional Collaboration section. However if that article discussed how digital communication was affecting internal and external library communications and changes that this was causing in reference services, then that article would be listed in this section.

Many of the articles in this first section are theoretical or philosophical. Most of them are intended to persuade the writer into adopting certain beliefs or behaviors. In most cases personal experience or impressions serve as the main support for positions advanced. A few like Tenopir's articles or Ladner's article rely on surveys of a number of libraries or librarians. In effect these survey articles are like the other kinds, except for being more robust in the sample size. The only work that avoids this is Xu's article which analyzes advertised position descriptions. However a position description is based on local beliefs, not objective evaluation.

This is the largest section. It is also the one that deals most with overarching issues or looks at reference services collectively.

Stieg, Margaret F. "Technology and the Concept of Reference or What Will Happen to the Milkman's Cow?" *Library Journal* 115 number 7 (April 15, 1990): 45-9.

This philosophical article analyzes the core value of reference service as the provision of service. Service is composed of an attitude and a product. Good service involves personal communication and self-monitoring. Technology is changing society so that many service situations are becoming more impersonal. The level of civility in business encounters has been reduced, while greater efficiency is expected. However it is

expected that technology will not remove the personal intermediary position that reference librarianship occupies between patrons and information sources.

Hallman, Clark N. "Technology: Trigger for change in reference librarianship." *Journal of Academic Librarianship* 16 number 4 (September 1990): 204-8.

Hallman presents a thorough explanation as to why information technology is affecting librarianship. Reference librarians are guides to information. Information technology change will require those librarians to become guides to electronic resources. This will require the added knowledge of and skills in: technology; local electronic resources online electronic resources and interpersonal communication. The trend in academic libraries of encouraging a second master's degree is laudable, but does not address the increased competencies needed due to technology. It is recommended that reference service and its methods be re-evaluated.

Cargill, Jennifer. "The Electronic Reference Desk; Reference service in an electronic world." *Library Administration & Management* 6 (Spring 1992): 82-85.

Based on a presentation made earlier, the author argues that librarians must get to know their patrons' needs better to counteract the information explosion, technology explosion, particular technology extinction and competition. Reference librarians must focus on proactive, not reactive, service. Instruction, information literacy, outreach, and specialized reference will be reference growth areas. It is suggested that academic libraries will develop 24 hour computer laboratories. Electronic resources and the concomitant hardware will become very important for reference and reference areas will be re-configured to accommodate more computers.

Tenopir, Carol and Ralf Neufang. "The Impact of Electronic Reference on Reference Librarians." *Online* 16 number 3 (May 1992): 54-60.

This presents findings from an in-depth interviews with reference librarians at several academic libraries. The interviews were done as a follow-up to a survey of North American research libraries. That survey showed widespread use of "electronic reference options" and a large, planned expansion of those options (compact disk, read-only-memory [CD-ROM], intermediary services, user online searching, and online reference databases). The interviews were done by mail, telephone and in-personal with Association of Research Libraries (ARL) reference librarians. It was reported that due to electronic resources, there is in general an increased workload due to increased demand by patrons, increased demands of professional skills maintenance, and increased manual labor. A comparison of some library records shows that increases are being over-estimated. CD-ROM databases have a greater impact on reference workload than those mounted on OPACs. Partially this is due to physical location considerations. Library instruction has changed to emphasis electronic resources. Reference has also had to deal with changes in user attitudes. Patrons are more satisfied, perhaps due to the immediate response from electronic resources. However there is an increasing demand for full-text documents. The result has been to make reference more satisfying to reference librarians, mainly due to the increased satisfaction of the patrons.

Campbell, Jerry D. "Shaking the Conceptual Foundations of Reference: A perspective." *Reference Services Review* 20 number 4 (Winter 1992): 29-36.

In a time of growing use and shrinking budgets, the author undertook the study of the conceptual model of reference services. Campbell, not a reference librarian, reports reference service is in conceptual disarray, especially in regard to the economic basis. He creates seven categories of reference questions and then guesses as to the share each category has of the total reference workload. Based on those guesses, Campbell recommends that reference librarians should concentrate on developing software to answer, at first, 10% of the questions (the three smallest categories), then eventually 75% of the questions. Reference librarians should become "Access Engineers" with three major functions: mapping knowledge (all formats); consumer research (patron needs); and information transfer (from source to patron in a transparent manner). Access Engineering will also function as a research and development department for individual libraries and in aggregate for the entire profession. Economic support for this change will come from two areas; staff time savings from the software developed earlier and from the shrinkage of technical services due to the growth of electronic information.

Ladner, Sharyn, J. and Hope N. Tillman. "Using the Internet for Reference." *Online* 17 number 1 (January 1993): 45-51.

This is a report on a survey about the Internet and reference service responded to by 50 reference librarians in special libraries. In a carefully organized form, the authors define reference service and using the Internet. "Reference service is the provision of information upon request, independent of format or medium." Using the Internet includes receiving and transmitting reference request and answers, finding information and communicating with colleagues. Categories of reference use are: work-related communication, email and lists; searching remote databases; and file transfer, data exchange. Examples of each are given. Important listservs are described. All surveyed librarians described communication as the major aspect of the Internet in their work.

Simmons-Welburn, Janice. "New Technologies and Reference Services." *Reference Quarterly* 33 number 1 (Fall 1993): 16-19.

Simmons-Welburn points out the rapid changes in technology from 1980. It argues that there are two costs involved for libraries: complexity of research choice and an ever-increasing level of necessary technical expertise. A paradigm shift will be needed to train staff, instruct patrons and work with others in the information industry. Reference departments are adding electronic resources, but must consider how the patrons will effectively use them. It is recommended that interactive learning packages need to be utilized. User analysis is needed to inform librarians of user needs and the extent that the instructional program is meeting their needs. Finally collaboration with producers and publishers of information will result in more effectiveness and less cost.

LaGuardia, Cheryl. "Desk Set Revisited: Reference librarians, reality, & research systems' design." *Journal of Academic Librarianship* 21 number 1 (January 1995): 7-9.

This article sets forth the position that while economic hardships are downsizing academic reference staffs, the number of reference desk hours remain constant, and technology has increased the complexity of reference work. Patrons still need and want

reference help. Libraries need to refocus resources. Reference desk hours should be shortened so librarians can develop their electronic skills and knowledge. Further libraries should collectively develop effective, efficient and user-friendly systems as soon as possible.

Lewis, David W. "Traditional Reference Is Dead, Now Let's Move on to Important Questions." *Journal of Academic Librarianship* 21 number 1 (January 1995): 10-12.

As libraries move from being automated (paper resource based with an electronic catalog) to electronic (electronic resources and catalog), the reference model must shift. The past organization of information depended upon a physical presence of the resource. Today many of the resources are virtual. Libraries must connect to remote users and discover how to supply virtual resources. Selective quality and selective patron groups will be necessary. Instruction will grow in importance. Librarians will no longer invent the bibliographic access tools and academic libraries will become competitors to faculty.

Tenopir, Carol. "Integrating Electronic Reference." *Library Journal* 120 number 6 (April 1, 1995): 39-40.

Reports on a 1994 survey of the Association of Research Libraries about the extent of electronic resources offered in the ARL libraries and how these resources have affected the reference staff. This was a follow-up to a survey done three years before. University libraries have been most aggressive libraries in adopting electronic resources. Almost all offer CD-ROMs, but the stand-alone CD-ROM workstation is not a common, being replaced by Local Area Networks. Almost all offer mediated online searching, however the amount done by individual libraries is declining. End-user searching is increasing, from 45 % to 66%. Most libraries have online public access catalogs, often widely available outside of the library. Most also have tapeloaded databases as well. Most also are offering Internet access. Currency of skills and knowledge is becoming a concern of library staff. User training and expectations are also concerns. Integrated reference environments are being created for transparent use by patrons.

Xu, Hong. "The Impact of Automation on Job Requirements and Qualifications for Catalogers and Reference Librarians in Academic Librarians." *Library Resources and Technical Services* 40 number 1 (January 1996): 9-31.

This study examines changes in job requirements and qualifications in catalogers and reference librarians from 1971-1990 as shown by job advertisements. It is noted that there is a time gap or cultural lag between the implementation of new technology to corresponding changes in official duties and responsibilities. Technology's first impact on reference was through mediated data base searching. Database searching has changed somewhat, especially because of databases on CD-ROMs, but it still remains an important service. The demand for instruction has also grown due to technology. Some reference work, such as traditional directional and informational assistance has been passed on to paraprofessionals, leaving higher end and technologically advanced reference work to librarians. The study found that there were variations over twenty years in the number of positions advertised, although other studies cited suggest that the increased demand at the end of the 1980s was driven by replacement rather than expansion. Reference librarian job advertisements were significantly more likely to

require a second masters, however cataloger job advertisements were more likely to demand longer work experience. Both types of librarian are now required to have computer skills. In fact, "for reference librarians, experience of compute database searching has been the most important component of job qualification since 1980." The study concludes that there are far too many variables to draw many conclusions.

Stolt, Wilbur. "Managing Electronic Resources: Public service considerations in a technology environment." Collection Management 21 number 1 (1996): 17-28.

While not offering solutions, Stolt identifies and discusses nine concerns about the use of electronic resources in reference. Each concern is discussed as a separate item. The presentation and discussion of these considerations is beneficial, since most articles do not cover so many problem points. However there is no extended discussion of any single point, nor is there a coordinated approach to problem solving. The result is that this article serves to draw attention to a number of concerns, but offers like help in resolving those concerns.

Ferguson, Chris D. and Charles A. Bunge. "The Shape of Services to Come: Values-based reference service for the largely digital library." *College & Research Libraries* (May 1997): 252-65.

The authors discuss changes in libraries that will affect reference services. The changes flow from the shift from paper libraries to electronic libraries. This stated that this shift is more user-centered and will emphasis services rather than collections. New models of reference service, such as tiered service, roving reference and research consultation, are being developed. Re-configurations of reference staff to provide subject and format specialists are also being tried. The work of reference is being re-assessed and different variations are being implemented. All of this is being done in the context of technology creating both opportunities and attitude changes. Provision of asynchronous reference services to remote users is seen as inevitable. Instruction and collaboration will both be greatly affected by electronic networks. Certain elements will be unchanging despite technological advances. Patrons, the scholarly communication system and the need for assistance will remain, which will continue the need for reference services. Libraries must be clear about core reference values and continue to uphold those values.

Papandrea, Virginia A. "Managing Reference Service in the Electronic Age: A competing values approach to effectiveness." *The Reference Librarian* 60 (1998): 111-26.

The competing values framework developed in organizational management is recommended for use in reference librarianship. Reference has become increasing complex due to technology, increasingly diverse clientele, tight budgets, and librarians' increasing subject and technical expertise. There are expectations that traditional formats and services will continue and that more information will be made available even more quickly in the future. Librarians have responded by experimenting with various management structural changes. However most changes have been internally oriented, while external influences on reference service have been greatly increasing.

It is suggested that an overall conceptual framework needs to be developed. The competing values framework uses four models that differ on three main areas:

organizational focus; organizational structure; and organizational means and ends. The models are: human relations model; internal process model; open systems model; and rational goal model. The first two are internally focused. The last two are externally focused. Human relations and rational goal can be considered as opposed. Internal process and open system can also be considered to be opposed. Each model alone is insufficient. Management must implement a balanced use of each model. Three main imperatives derived from this are that reference librarians need to share managerial responsibility, diversify skills and perspectives, and become entrepreneurs.

Huwe, Terence K.. "The Social Life of (Reference) Librarians." The Bulletin of the Special Libraries Association, San Francisco Bay Region (electronic publication http://www.sims.berkeley.edu/sfsla/bulletin/may/soapbox.html).

Huwe argues that every field is interested in social interactions around information. He cites researchers from other fields that are studying documents, information seeking, and even reference librarians. His conclusions are that reference is a high-tech skill. It requires operating on several levels and that reference librarians are probably irreplaceable by computer programs. Therefore librarians need to push reference work to a higher level of visibility, especially through the use of technology. A good example would be establishing a virtual reference desk.

Tenopir, Carol. "The Impact of Digital Reference on Librarians and Library Users." *Online* 22 number 6 (November 1998): 84.

This is a repeat of a survey reported in 1992 (see above). The new study found that the changes in reference librarianship caused by technology have continued. The reported effects are in three main areas: attitude; instruction; and workload/workplace. Attitudes and expectations about electronic resources have change for both patrons and librarians. There are increased user expectations. However there is increased librarian satisfaction. Instruction in both source selection and in the use of individual reference resources as expanded. There is increase workload caused mainly by longer times spent with each patron, more formal instruction delivered and the necessity for continued learning about technology and individual reference sources.

Welch, Jeanie M. "Laser lights or dim bulbs? Evaluating reference librarians' use of electronic sources." *Reference Services Review* 27 number 1 (1999): 73-77.

Welch begins this article with a short but thorough review of the growth of technology use in reference services beginning in the 1960's. This is coupled with the trend for evaluation, specifically performance appraisal.

Recommended core competencies for librarians that were enacted for the University of North Carolina at Charlotte are presented. There are two different core lists: those for reference librarians and those for subject specialists. The main differences in competencies expected is that reference librarians are expected to be familiar with a range of resources and basic search strategies, while subject specialists are expected to have in-depth knowledge of the resources in a subject field. Methods of evaluation (observation, patron evaluations, citation analysis of student papers and analysis of subject specialists' web pages) are also suggested.

Felt, Elizabeth Caulfield. "Holland Library's Electronic Resource Librarians: A Profile of these positions." *The Reference Librarian* 64 (1999): 75-112.

Felt describes how and why traditional reference positions were converted into electronic resource librarian position and what differences are between the positions. The first two positions were originally to support the use of CD-ROMs in specific subject areas in reference. However it was discovered that the CD-ROMs blurred the difference between subject content, so one of the positions was switched to support government documents in CD-ROM format. Two other positions became at least partially electronic resource librarian positions as well. One serves as a backup. The fourth does not carry the title, but provides support for Geographic Information Systems (GIS). All positions continue to evolve. Additional duties now include liaison to the systems librarians, creation and maintenance of the library's web site, and user instruction in technology.

Allen, Nancy. "Promise, Perils, and Planning: An Administrative Commentary on the Use of Technology to Expand Reference Services." *The Reference Librarian* 65 (1999): 15-28.

The general promise of technology for libraries includes new instruction strategies, improved resource management, inter-staff communication, communication with patrons, public relations, cooperative collection development, instructional design collaboration (for academic libraries), remote provision of services. These may all lead to greater quality of reference services.

There are a number of problems that technology can also promise: continuing education; poor morale; job dissatisfaction; technological barriers to certain users; and computer downtime. Planning can help avoid or allay some of the problems. Cooperation through a consortium can also help. Since technology takes funding, careful budgeting needs to be done. Innovative approaches, such as partnering and fund raising, should be explored. Technical support and staffing can be crucial problems. Careful advance planning needs to be done to minimize the inevitable problems. This planning should be done by each library department to maximize their effectiveness. The recognition that each service and program has an opportunity forgone cost should always be considered in creating new service and programs or in canceling old ones.

Mann, Thomas. "Reference Service, Human Nature, Copyright, and Offsite Service -- in a 'Digital Age'?" *Reference and User Services Quarterly* 38 number 1 (1999): 55-61.

The author begins by establishing by publishing records that this is not yet the digital age and that libraries are still access points to non-digital information. Copyright is explained to exist to encourage publication by giving rewards to the information producers. Without copyright, there is much less incentive to disseminate information. However copyright limits electronic access except through a location, such as a library, that will pay for the access. This parallels the non-digital information situation, where the library pays for user access to published materials. Reference librarians also need to counteract some patrons' perceptions that digital information is all that is needed now. Given finite library resources, the provision of remote reference service will be done at the cost of other library service. It is suggested that copyright law could be amended to allow academic libraries to digitize some copyrighted materials.

Reger, Nancy K. "Redefining Reference Services: Transitioning at one public library." *Reference and User Services Quarterly* 38 number 1 (1999): 73-4.

One public library has tried to meet technological changes in reference by development and training. The library's staff has created a core reference sites list for the reference desk, conducted reference training workshops, had reference libraries review sites for the core list, and developed a virtual reference desk. This has taken more staff time. This time requirement is met by flexible staffing, training and revision of service guidelines. Librarians are expected to provide certain minimum functions. Partnerships with other agencies and community groups have also been established.

Morgan, Eric Lease. "What's More Important: The questions or the answers?" *Computers in Libraries* 19 number 5 (1999): 38-42.

Morgan begins with a brief history of information locating tools such as accession lists, table of content and indexes. He points out that no tool will work for every user population or even individual. Next he contrasts browsing behavior with searching behavior to point out that they are different and complementary. This leads to the suggestion to create an expert system as a reference assistant. Pre-existing models of reference behavior could be adapted to a web environment. Patrons could access the assistant which would request certain general types of information from the patron, just as librarians do in a reference interview. The assistant would use the patron-provided information to present a list of possible information sources. A feedback loop from the patron could provide a more refined list. If the patron is not satisfied with the results, a reference librarian would be available for consultation.

FORMATS OF REFERENCE INFORMATION

Information is stored or transmitted in a number of formats. Some of the formats are physical, others are digital. Each format has different properties and uses. Each may demand different treatment by librarians and patrons. Librarians have long contended with multiple formats in their libraries; however the amount of formats available is rapidly growing.

The articles in this section deal with both major types of formats -- the physical and the digital. The articles have been placed into sub-categories corresponding to their format. In the case of the vertical file, the format is not technologically new. However the use of a database connected to the local OPAC to provide access to the vertical file is a new technological twist. The other articles discuss formats that are recent technological developments.

GENERAL

Force, Ron. "Planning Online Reference services for the 90s." The Reference Librarian 43 (1994) 107-115.

A comparison of online databases, CD-ROMs and databases mounted on local OPACs is given. No one technology is seen a superior. The local situation, especially in regards to budget and computer support, are important variables that can affect decisions. The author writes that even the smallest library can now afford one of the three technologies. Challenges for planning in the remainder of the 1990's are identified as economics, resource explosion, infrastructure and a digital divide between small and large institutions.

CD-ROMS

McCarthy, Cheryl A., Sylvia C. Krausse, and Arthur A. Little." Expectations and Effectiveness Using CD-ROMs: What Do patrons Want and How Satisfied Are They?" *College and Research Libraries* 58:2 (March 1997): 128-142.

This study evaluates the CD-ROM environment in one academic library. A through analysis of user's abilities, problems and expectations are presented. Recommendations for improvements in CD-ROM services are presented, mainly drawn from user requests. In the particular library studied, it is noted that "although the budget has decreased, the CD-ROM and electronic database services have increased." Of

especial interest for reference is the observation that CD-ROM technology has greatly increased the number of reference queries for assistance, although the amount of reference staffing has not increased. The increase in reference queries is also shown in the user survey. Patrons expressed a preference for "personal assistance at the point of need."

Vyhnanek, Lou. "Managing CD-ROM and Electronic Documents Sources for Holland Reference Services: The Washington State University Libraries Experience." *The Reference Libr*arian 64 (1999): 113-24.

The beginnings and evolution of CD-ROM and electronic documents in reference use at a single academic library is detailed. In a seven-year period this use has grown from a single CD-ROM to over 200 CD-ROMs, Internet resources and online databases. Since the library involved is a large depository library, this growth was heavily influenced by the increasing federal use of electronic resources. Four phases of development are described: CD-ROMs on reserve for use on a dedicated workstation; a jukebox cartridge on an improved workstation; movement of CD-ROMs to a cabinet with another improved workstation; then movement of some of the CD-ROMs to the media collection, addition of others to the library's Local Area Network (LAN), and creation of a Government Documents/Data Files Librarian. The trend of government information moving from paper to CD-ROM to the Internet is clearly laid out. It is noted that librarians need to develop increasingly detailed skills and that libraries need to keep current in technology.

GIS

Yu, Lixin. "Geographic Information Systems in Library Reference Services: Development and Challenge." *The Reference Librarian* 60 (1998): 87-110.

Yu defines GIS and presents the history and development of GIS services in libraries. Detailed examples of GIS functions are given. Differences between traditional cartographic materials and GIS are carefully explained. GIS started in research libraries and specialized libraries in the early 1990's. GIS presents special challenges to libraries. It requires specialized software, databases and hardware (all three expensive) as well as knowledgeable assistants to aid patrons. To overcome the high demand on librarian assistance in GIS, it was recommended to: simplify the user interfaces; have multiple levels of usage; and collect easy to understand data. Although it appears that GIS has been used primarily in special collections or special libraries, it is suggested that there are strong parallels between online database searching and GIS. When online database searching was introduced into libraries, it was librarian-mediated. Now most searching is unmediated. Currently GIS is mainly librarian-mediated. It may not be so in the future.

Graphics

Beneman, William E. "Reference Implications of Digital Technology in a Library Photograph Collection." *Reference Services Review* 22 number 4 (1994): 45-50.

An in-progress project to convert 7,000 photographs to a digital format is reported as a case study. Bancroft Library, a photography collection at the University of California, Berkeley, conducted this project as a feasibility study for converting more of its 3 million item collection. These digitized photographs will then be able to be viewed on public terminals in the library. Photography collections have had special cataloging and reference problems since the indexing choices for a particular photography are so many. It was hoped that by digitizing the photographs, patrons could browse through the collection more easily. The photographs were originally contained in 78 binders which constituted the index. The digitized photographs were assigned nine access points instead of the single one currently used. Inconsistency of Library of Congress headings had to be reconciled. The establishment of local cataloging standards is discussed.

Vertical Files

Kronenfeld, Michael and Louis Howley. "Theory and Implementation of an Automated Vertical File." *Reference Quarterly* 33 number 3 (Spring 1994): 387-94.

When the Maricopa County Library Center decided to develop a vertical file, it was decided that patron access needed to be maximized. PROCITE was used to a bibliographic database to create records for the pamphlets. A work form had to be designed. Since professional cataloging would not be used, AACR2 standards were not attempted. A special MARC record template as created. Reference staff enter the title and subject headings on the vertical file folders. Those titles are then entered in to the 245 MARC field. Subject headings are entered into the 600 fields. Each folder is barcoded. The record is entered into the local OPAC database so that patrons can find particular vertical file folders. There is also a date entered field that aids the staff in weeding outdated pamphlets. The result has been a valuable enhancement of the library collection.

WWW

Koutnik, Chuck. "The World Wide Web is Here: Is the end of printed reference sources near?" *Reference Quarterly* 36 number 3 (Spring 1997): 422-25.

An experiment as to the effectiveness of using the World Wide Web (WWW) to answer reference questions was conducted. 104 reference questions were drawn from a published collection of reference questions. WWW search engines and directories were used to hunt for the answers. A time limit of ten minutes was established. Records were kept as to the amount of time and the success of the search. 37.1 % of the sample questions were answered. It was concluded that the WWW will not answer all questions, but it is a better single source than any others. It is not a fast tool however and it will not replace printed reference sources.

REMOTE DELIVERY OF INFORMATION

Although the delivery of information to remote users appears to be a well-received and increasing service, articles specifically on the topic are no longer appearing. The remote public's access to OPACs and online databases was one of the first technology changes in reference outreach (after the telephone, FAX and email). Currently, it is only one aspect of remote services provided however. Often now, discussion centers around helping patrons select which services or resources are needed by a particular patron. The concept of remote delivery has become an accepted and expected service.

Quinn, Judy and Michael Rogers. "'122 Million Library Users Ask for More Technology." *Library Journal* 116 number 7 (April 15, 1991): 14-5.

Reports on the study "Using the Public Library in the Computer Age: Present Patterns, Future Possibilities." This national survey found increased library use in almost all library services. Most groups (especially minorities) want online information (especially consumer information). It was reported that online databases are increasing in amount and use. However it was also pointed out that economic disparity creates a barrier to at-home online information provision.

Algermissen, Virginia, Sharon Helton, and Jack Smith. "Bringing the Mountain to Mohammed without Falling off the Cliff of Unmanageable Technology." *Information Technology and Libraries* 11 number 3 (September 1992): 259-61.

A medical center library wanted to provide online, remote access to a number of medical databases including MEDLINE and the Comprehensive Core Medial Library. No commercially available programs could provide exactly what was desired so the library created its own system to permit patrons to remotely access BRS Colleague. There were minor technical and user training difficulties. The user base expanded greatly due to the perceived value of this easy remote access.

See also

CONNECTING REFERENCE LIBRARIANS TO REMOTE USERS

Email

"The Net and Reference Services: Capture the question." *Wilson Library Bulletin* 68 number 2 (October 1993): 12.

USE OF REMOTE RESOURCES IN THE REFERENCE TRANSACTION

This section contains articles discussing how reference librarians use remote resources with patrons in a face-to-face setting. The articles show the development of such resources. The earlier articles discuss alphanumeric interfaces like file transfer protocol (ftp), telnet, and gopher. There was discussion continuing for earlier about mediated searching of online databases. OPAC were becoming publicly accessible. The online databases were added to the alphanumeric OPACs. In the mid 1990's the WWW began to replace the non-Graphic User Interface (GUI) OPACs and permitted a great increase in the ready availability of remote reference resources. A number of suggestions on the use of the WWW in reference are made. This area of technological change in reference continues to be a major area of research and development.

Macklin, Lisa A. "Journal Contents Online: Patron Use and Implications for Reference Service." *The Serials Librarian* 21 number 2/3 (1991): 189-91.

Macklin reports on a workshop lead by Melissa Bradley and Patricia Wallace wherein they reported on their study of the Colorado Alliance of Research Libraries (CARL) UnCover database. At that point in time, CARL was three years old and provided an online index to over 1.6 million articles. The libraries involved by the study were primarily academic, but included one public library (Denver Public Library). Transaction logs were kept of selected terminals at selected times. Patrons and librarians were not informed of the study. The amount of data was small, due to several possible reasons, however some areas for improvement of CARL were identified. Help screens need to be modified. A computer version of the reference interview is suggested at the beginning of an online session. User problems such as pre-dominantly single term searching were identified. The resulting discussion centered on instructions for users.

Lanier, Don and Walter Wilkins. "Ready Reference via the Internet." *Reference Quarterly* 33, no. 3 (Spring 1994): 359-68.

Reference librarians may become "access engineers" as more sources to answer ready reference questions become available online, especially since some formats being created by vendors are more user friendly that those currently in use. The abilities to search, download, or capture digital output are powerful patron resources. Although the concepts remain relevant, the details are rapidly becoming dated. FTP, telnet and gopher are the main networking technologies discussed. A list of commands for patron use of mainframes is again outmoded. The discussion about the use of listservs for

collaborative work and continuing information is still of interest. Lanier and Wilkins suggest that the structure of reference will be changed by the wide-spread availability of information. Ready reference will have to be re-defined. Reference itself will have to become more time conscious, both because of staff training issues and information mediation issues.

Olszewski, Lawrence J. "Madonna, Brahms, and President Clinton: Reference Use of the OCLC Authority File." *Reference Quarterly* 33 number 3 (Spring 1994): 395-403.

The OCLC authority file is presented as an under-utilized reference desk resource. The three examples alluded to in the title are used to illustrate the potential value of the authority file in reference transactions. The main benefits given are: cost; biographical and geographical information; verification; cross references; and cited references. The article includes information on how the authority files were made, how to search the files and how to interpret the results of a search.

Mellendorf, Scott A. "Automating Access to Internet Resources at the Reference Desk." *Online* 18 number 5 (September/October 1994): 69-73.

Saginaw Valley State University's reference staff developed an alphanumeric menu for Internet resources to access from the reference desk via modem. Four main categories of resources are presented on the first screen: online catalogs; online databases; net access; and miscellaneous resources. The reference staff chose the resources within each category. An automated logon process was used. However the modem created noise at the reference desk until a disabling dial command was used. The process was also lengthy and staff training was required. The logoff procedure was also improved. The script files and keyboard commands are presented.

Healey, Paul D. "Untangling the Web: The World Wide Web as a Reference Tool." *Reference Quarterly* 34 number 4 (Summer 1995): 441-4.

Although dated in many ways, this article can still serve as an introduction to the librarian who is a novice in the World Wide Web. The first third of the article describes the WWW, its organization and possible connections (such as to a local CD-ROM LAN). General types of information available and of interest to libraries, especially law libraries are covered. Some basic difficulties such as identification of reliable resources and longevity of online resources are also discussed. Healey wrote a useful introduction to the WWW for librarians, however it is now somewhat dated.

Dickstein, Ruth, Louise Greenfield, and Jeff Rosen. "Using the World Wide Web at the Reference Desk." *Computers in Libraries* 17 number 8 (September 1997): 61-5.

Provides an overview of the uncertainty of using the WWW for reference. The fugitivity and questionable authority of web pages are highlighted. Recommendations as to the general type of questions that could best be answered by web pages are made. Brief directions on the use of search tools such as Yahoo, Lycos, and Excite are given. No recommendations are made as to which to use for particular types of questions. Generalized search syntax is given, along with the recommendation to check out the advance searching tips on search engines. Relevancy algorithms are briefly mentioned. Librarians are urged to practice using web sites so that expertise with web resources is

developed. Bookmarks on the reference desk computer and even the creation of special library web reference pages are recommended.

Hsieh-Yee, Ingrid. "The Retrieval Power of Selected Search Engines: How well do they address general reference questions and subject questions?" *The Reference Librarian* 60 (1998): 27-47.

Librarians' attempts to create systems to locate valuable information in the Internet are many and continuing. This article looks at using the general search in answering reference and subject questions. Reference questions were actual questions asked at a university reference desk. Subject questions were artificial (made up for the study). Eight search engines were studied by several experienced searchers. Results were measured by four variables: precision; duplicate; most-relevant-item; and relevancy-ranking. It was noted that for some of the questions a reference librarian would not have used the Internet in searching for an answer. Scores of the eight search engines on each variable were presented. The conclusion was that in general search engines do not produce good results for reference questions, but do produce better results for artificial questions.

Ballard, Terry. "Going to the Source for Information: Direct links to articles could change the face of the reference desk." *Information Today* 15 number 8 (September 1998): 54.

Implications of the increasing online access to individual articles are discussed. Information providers have started allowing direct access to full-text articles, instead of the prior procedure of requiring access through a main screen to the article database. This permits a professor to create her own electronic course reserve web page. Catalogers are adding web links in their catalog by use of the 856 marc field.

Su, Di. "Electronic Stacks: Using Web Sources in Reference Service." *The Reference Librarian* 65 (1999): 161-76.

Su begins by reviewing some of the WWW's properties (hypertext linkage, currency, ubiquity, and multiple simultaneous users) that make the Web valuable for information provision. Su points out that due to online advertising, some information that libraries pay for in print is free on the Web. Then Su also discusses problems such as slow connections, computer crashes, incomplete documents, and document reliability. Next Su recommends that librarians organize the Web for reference just as librarians have organized other materials. Collection development needs to be extended to the Web. Reference collections can be built by web pages or through bookmarks. Then an annotated list of recommended web sites is given. Su concludes "When it (the Web) is used properly, Web sources can enhance reference service in an effective way."

REFERENCE COLLECTION BUILDING

The reference collection development articles listed in this section are at least partially about the process of collection development in an online environment. Not included are a large number of articles reviewing or recommending individual online resources. An excellent example of this is the Reference Librarian 57 (1997). It is on the theme of "Reference Sources on the Internet: Off the Shelf and Onto the Web." This issue has twenty-six articles and 233 pages reviewing individual resources, nearly all of those being web sites.

It appears that the WWW was primarily responsible for the great interest in online collection development. Until a large quantity of reference information was available online for free or for a reasonable price, there was little reason to be concerned with online collection development. Now that there is such a body of information, general issues of collection development are of concern to reference librarians. These are issues like how to select resources, how to evaluate those resources, and how to connect users (both on- and off-site) to remote resources.

Starr, Susan S. "Evaluating Physical Science Reference Sources on the Internet." *The Reference Librarian* 41/42 (1994): 261-73.

Although this article is very dated, it is still very informative. The individual online sites reviewed are gopher, telenet, listserv, and Bulletin Board Service (BBS) oriented. The WWW is not mentioned. Since the information discusses only alphanumeric interface, the article is pre-GUI. However the article is organized by reference type with an introduction as to the common scope and use. This typology is still valid and quite helpful. Sections of the article are: bibliographies; indexes and abstracts; handbooks, manuals and guides; and directories. An explanation of early (and now outdated) online searching is given. Choice and evaluation of online sources are treated separately. Evaluation is based on William Katz's six criteria.

Pratt, Gregory F., Patrick Flannery, and Cassandra L. D. Perkins. "Guidelines for Internet resource selection." *College and Research Library News* 57 number 3 (March 1996): 134-5.

This short article consists of guidelines developed for the Houston Academy of Medicine-Texas Medical Center Library. There are six annotated criteria, one with subdivisions. They are: Quality and Content; Relevancy; Ease of Use; Reliability and Stability; cost and copyright; and Hardware and Software. Quality and Content are subdivided into: Credible source; importance of resource; comprehensiveness or uniqueness; complete content; and currency.

Rosen, Jeff and Carl E. Snow. "Internet Resources for Ready Reference." *College and Research Libraries NewsNet* (electronic publication http://www.ala.org/acrl/resjan97.html) 57 number 12 (January 1997)

While this article concentrates mainly on reviewing major web reference sites, the introduction briefly covers some main points about web collection development. It is recommended that a ready reference web page be made for the use of both reference librarians and patrons. This page should help to quickly locate and link to web sources.

Snavely, Loanne. "Building the Virtual Reference Shelf: How to get the most for your money." *Information Outlook* 1 number 7 (July 1997): 24-8.

The main part of this article is short reviews of selected web sites. The reviews are organized by subject heading (such as encyclopedias, biography and foreign exchange rates) and include the Uniform Resource Locator (URL). Besides reviews, general considerations of building an online reference collection are briefly identified: access (equipment, software and communications), budget, collection issues and service issues.

Ballard, Terry. "Internet Reference: Just the Good Stuff." *Information Today* 14 number 11 (December, 1997): 61.

Discusses when to use the Internet for Reference information and when not to use the Internet. Points out that reference librarians must be familiar with using Internet reference sites and recommends establishing bookmarks on the reference computer in advance. Reviews a number of good sites (such as ERIC, Medline and Statistical Abstracts) for reference materials. Also discusses assessing quality by use of reputable sites/institutions, both for their own information and their directory links to other resources. The Internet Public Library is cited as an excellent site. Concludes that reference librarians need to build their own bookmark files to provide an individualized ready reference guide for their own particular clientele.

McDermott, Irene E. "Virtual Reference for a Real Public." *Searcher* 6 number 4 (April 1998): 25-31.

Although the majority of this informal article reviews particular web sites for a reference collection, it also discusses: information generation by libraries; localized web information; and interactive reference sites. It also has a sidebar detailing a particular case where the failure to search the Internet resulted in a failed reference interaction. It is suggested that the type of information generated by libraries to be placed online should be local information and heritage material. Examples of such practice are cited.

Carr, Alan F. and Robert Stibravy. "Designing a Web bookmarks page for reference desk use." *Bulletin of the Medical Library Association* 87 number 1 (January 1999): 80-2.

A case study in a biomedical academic library on the creation of set of bookmarks for a reference desk newly connected to a LAN and the Internet. The bookmarks were placed only on the reference desk computer, not on the public access computers. The resources were selected based upon reviews or upon past reference experience. The bookmarks were organized into twelve categories. The public access computers connected to the library's home page, which provided links to a collection of selected Internet resources established in the same manner as the bookmarks. The resources on the home page were classified into seven categories. BioSites, a multi-library collaborative project selecting biomedical sites, was also linked to by the home page. Due to high duplication, after a few months the library discontinued adding sites to the local Internet resources page in favor of BioSites. At that time, the reference desk bookmarks were weeded. The classification was changed to that used on the local Internet resources page, however subdivision of some categories were established. The result has been well-received and well-used by the library staff.

CONNECTING REFERENCE LIBRARIANS TO REMOTE USERS

There have been a number of digital electronic tools used by reference librarians to communicate with remote patrons. Postal mail, telephone and fax machines have been and still are being used. This section is broken into a number of sub-categories. The history of these recent developments is clear from the publications dates of the various articles. BBS and email are earlier tools. Videoconferencing and WWW forms are later tools. Videoconferencing actually has two different tools that can be and have been used. ITV relies on a two-way interactive television connection. Desktop or Internet videoconferencing is a newer and cheaper alternative which uses much less expensive and elaborate equipment. At least one of the articles, the one by Young, confuses the two, but they are distinctly different. The three general articles reflect the growing use of connecting reference librarians to remote users. When this service was new and experimental, the articles were reporting individual projects. As the concepts became put into practice more widely, then articles addressing the impact to or integration of these services into the reference department have become of greater practical interest.

General

Archer, Sarah Brick and Melissa Cast. "'Going Where the Questions Are': Using Media to Maintain Personalized Contact in Reference Service in Medium-Sized Academic Libraries." *The Reference Librarian* 65 (1999): 39-50.

A brief review of the development of reference services shows that de-centralizing the reference location is a continuing trend. Reference needs to be provided to the patrons at the patron's location. Telephone reference has developed for this reason. Roving reference is a more recent development that in academic libraries is reported to have very salutatory advantages. Desktop videoconferencing or Multi-user dialogs object oriented (MOOs) are presented as the next logical step in reference outreach. The Internet Public Library is described to illustrate the MOO possibility. It is also pointed out that the provision of information such as hours, directories, databases, and collection descriptions via web pages are basic reference services. Email reference services are mentioned. An important point raised is the problem of the audience and level served.

Reference departments need to be explicit as the clientele to be served and the level of service to be provided.

Koyama, Janice T. "http://digiref.scenarios.issues" *Reference and User Services Quarterly* 38 number 1 (1999): 51-3.

Potential problems or changes in reference service as that service becomes digitally delivered are identified. It is stated that most digital reference is asynchronous by either email or video. This will permit patrons to do comparison shopping of reference services to compare accuracy and speed. Supervision in the form of monitoring, as is done with some business in telephone service, may also develop. However reference may become digitally synchronous, however designers of digital libraries have not incorporated the concept of reference service into their designs. It is essential that digital reference services be planned to fit the particular needs of the institution. That plan needs to consider financial, staffing and training issues as well.

Lankes, R. David. "AskA's: Lesson learned from K-12 digital reference services." *Reference and User Services Quarterly* 38 number 1 (1999): 63-71.

A short, but good literature review recaps the development of libraries and changes in reference services through four stages of Internet development. The stages are: traditional (paper resources); automated (mixture of paper and digital resources with an OPAC); hybrid (both paper and digital with some remote access to digital resources in addition to the OPAC); and digital (only digital information). K-12 digital reference sources, such as the Virtual Reference Desk, Ask Dr. Math and the MAD Scientist Network, were studied as the final stage. These services used many different technologies, cover the spectrum of information and are showing huge increases in service numbers. Three conclusions are discussed: digital reference is possible; experts can be part of the collection; and digital reference does not require extensive computer expertise. Software is being developed to support remote reference services. Particular programs of promise are reviewed and discussed. The article closes with mention of funding for remote reference services. It is suggested that libraries cooperate in a virtual electronic marketplace to pool resources. An alternative suggestion is that an outsourcer could be put on retainer to answer all questions.

Sloan, Bernie. "Electronic Reference Services: Some suggested guidelines." *Reference and User Services Quarterly* 38 number 1 (1999): 77-81.

Provision of electronic reference services to remote users has been growing in an informal manner. These services need to be distinguished from provision of electronic resources. The services also need some general guidelines to aid in efficient and effective development of those services. Brief suggestions are made in the categories of: administration; services; clientele; personnel; infrastructure; finances; and evaluation. Many of these guidelines require the library or its parent institution to question the degree of commitment or dependence will be required to meet programmatic needs. If pre-planned guidelines are not used, then an organized development of electronic references services cannot be done.

Goetsch, Lori, Laura Sowers, and Cynthia Todd. **Electronic Reference Service: A SPEC Kit**. Washington, D.C.: Association of Research Libraries, 1999.

A survey sent to the ARL libraries received 78 responses reporting on whether or not electronic reference services were offered. Electronic reference services were defined as "reference service designed for remote users and identified by a specific link from a library's website. (p. 7)" Three fourths of the responding libraries offer such services and almost half link to these services from the library's homepage. This has been a steadily increasing number. Most report increasing usage. Most have conducted no user assessment of the services. The majority of the SPEC Kit is copies of web pages demonstrating the libraries' webpage design.

Electronic Bulletin Boards (BBS)

Wirick, Terry. "GET Reference After Dark." *Computers in Libraries* 11 number 3 (March 1991): 22.

GET Reference After Dark is a computer bulletin board service to provide asynchronous library services after library hours. Users may electronically contact the BBS to leave email reference questions, books requests and comments. A librarian checks the BBS each day to gather messages from the night before. Questions are answered via email. The answer includes the source and the initials of the librarian providing the answer. Long answers are not provided, but the names of resources containing the answer are provided. Technical details of setting up a BBS service are included.

Email

"The Net and Reference Services: Capture the question." *Wilson Library Bulletin* 68 number 2 (October 1993): 12.

This is a brief introduction in the News and Trends column concerns the concept of providing online reference service. Email reference is the only kind of technology format considered. Comments from various librarians are provided. One particular comment that libraries "don't have menus" is quite dated and obviously pre-WWW, as is this whole article. Several email reference services are also described.

Johnston, Pat and Ann Grusin. "Personal Service in an Impersonal World: Throwing life preservers to those drowning in an ocean of information." *Georgia Librarian* 32 (1995): 45-49.

Although this article was written just as the Georgia Institute of Technology was transferring its provision of remote access from an alphanumeric, menu-driven BBS to a WWW based system, it is still of current interest since the reference service remains to be email based. The BBS system provided access to the OPAC, Uncover, and seventeen databases. One item on the menu was the reference service. Since logon was required to use the BBS, all reference questions had not only a time/date stamp, but included user identification. The questions were email to a single email account, which all librarians participating in the service could access. During the first academic year of service, 237

questions were answered. Users were faculty, graduate students, and undergraduate students. Included are the results of an email survey that was conducted. The service was viewed as a success and will be continued in the new WWW based system with more access points to the reference service.

See also

PROFESSIONAL COLLABORATION

Balas, Janet. "Building Virtual Libraries." Computers in Libraries 16 number 2 (February 1996): 48-50.

Multi-user Object Oriented (MOO)

Lagace, Nettie, and Michael McClennen. "Questions and Quirks: Managing an Internet-Based Distributed Reference Service." *Computers in Libraries* 18 number 2 (February 1998): 24-7.

The Internet Public Library (IPL) is a virtual library located in a MOO. It is run by the University of Michigan School of Information. The IPL Reference Center was modeled after the traditional physical reference desk. It had a distinct location and function within the IPL. Although the IPL is a MOO and hence a synchronous environment, the IPL Reference Center appears to work in an asynchronous mode. Patrons leave questions via a web form or email. Reference librarians respond with answers (usually directions to web pages that have the answer) latter. It is noted that the amount of questions asked varies, but that the IPL is usually not able to answer all questions each day due to the volume. Volunteer librarians are also utilized. The nature of email reference is described. The web form took the problem of asynchronous communication into account by use of an elaborate form to elicit exact information about the patron's information need.

See also

PROFESSIONAL COLLABORATION

Balas, Janet. "Building Virtual Libraries." Computers in Libraries 16 number 2 (February 1996): 48-50.

Videoconferencing

Young, Jeffery R.. "Librarians Use Videoconferencing to Connect with Patrons, Colleagues." *Academe Today* (electronic publication http://sunsite.Berkeley.EDU/~emorgan/see-a-librarian/article.html) (July 16, 1996)

This short article discusses two library ITV projects. The University of Michigan Shapiro Undergraduate Library uses videophones to connect reference librarians to patrons in residence-hall libraries. Eric L. Morgan at North Carolina State University set up an Internet-based ITV forum to discuss videoconferencing and libraries, mainly centered on the Shapiro experience.

Westwood, Karen. "Lights! Camera! Action!" *American Libraries* 28 number 1 (January 1997): 43-45

The Minnesota State Law Library reports on its Law Library Service to Prisoners provision of reference service to the Moose Lake Correctional Facility. The facility was not large enough to warrant a librarian, however it was large enough to need part-time librarian help. However the facility was also located at a distance from the State Law Library. So ITV reference service is offered every other Friday afternoon as a cost-cutting service. This service also includes the transmission of documents via a graphics camera. There are quarterly visits by librarians to conduct inventory and to oversee support staff. Difficulties have arisen and been solved. This takes place in a pre-existing site. The Minnesota Department of Corrections is using ITV to provide telemedicine, parenting classes and college courses at certain locations as well.

"Virtual Service." *American Libraries* 28 number 1 (January 1997): 44-45

This is a sidebar to the Westwood article. Two other ITV library experiences are presented. Eric Lease Morgan's CU-SeeMe Internet forum originating from North Carolina State University is described. This was a real-time, forum for librarians to discuss ITV and Internet videoconferencing. The University of Michigan's Shapiro Undergraduate Library's videophone reference service to residence hall libraries is also discussed.

Folger, Kathleen M. "The Virtual Librarian: Using Desktop Videoconferencing to Provide Interactive Reference Assistance." (electronic publication http://www.ala.org/acrl/paperhtm/a09.html)

Describes a couple of library videoconferencing experiences briefly (Eric Lease Morgan's "See You See a Librarian" and the Center for Business Information at Emory University) but mainly discusses the University of Michigan's Shapiro Library's program to provide remote reference service to the resident hall libraries. The reference libraries were connected for two hours on two evenings per week via computer using the CU-SeeMe program. It was reported that the students seemed more interested in the technology than in using the reference service.

Lessick, Susan, Kathryn Kjaer and Steve Clancy. "Interactive Reference Service (IRS) at UC Irvine: Expanding Reference Service Beyond the Reference Desk." (electronic publication http://www.ala.org/acrl/paperhtm/a10.html)

This cyber-document reports on a pilot project using synchronous desktop videoconferencing for reference services using the CU-SeeMe software. The Science Library at the University of California Irvine is providing remote, interactive reference to medical students at a computer lab in another building on campus. The Science Reference Desk was already staffed simultaneously by both a librarian and a library assistant. Another librarian was added during the hours that the Interactive Reference Service is offered. This service is provided one hour per day during weekdays. The librarian is able to set up a connection remotely. Signage alone appeared insufficient to create usage, so email solicitation of student volunteers to test the service was used. Through the use of rewards, test subjects were recruited. The majority of the assistance

was on using Medline. Several comments for improvement from both subjects and the librarians end the article. These comments address technical, social and time elements.

McGeachin, Robert B. "Videoconferencing and Remote Application Sharing for Distant Reference Service." *The Reference Librarian* 65 (1999): 51-60

This theoretical article describes the technological ability and requirements to provide reference service by videoconferencing and remote control or viewing of software. The importance of synchronicity and of visual information in the reference interview is explained. The need for remote reference service is discussed. The only actual use mentioned is University Michigan's. Most of the article discusses what hardware and software would be needed to connect for either videoconferencing or for remote sharing or control of software. It is pointed out that the demand of remote reference services will grow rapidly as technology progresses. Difficulties and barriers are not discussed.

WWW Forms

Haines, Annette and Alison Grodzinski. "Improving, expanding and promoting remote reference services." *College and Research Libraries News* 60 number 4 (April 1999): 271-2+.

A short article that adequately explains the advantages of using a form on a webpage for patrons to submit questions to the reference desk. The authors wisely point out the parallels to email reference. The claimed advantage of a webpage form is that it is more pro-active by the library than just an email link. Another advantage is that a brief reference interview can be conducted by have fill-in-the blank sections to elicit particular types of information from the patron. Anther claimed advantage is that patrons can use a webpage form and receive a response via email, postal mail or telephone. Other promised advantages are that reference librarians will become better computer users through practice and that the library will have improved public relations through an improved web presence.

MISCELLANEOUS

This final section includes articles on a number of relatively unrelated topics. Attitudes toward electronic resources are investigated in two articles. The first studies patron attitudes. The second studies reference librarians' attitudes. Behavior of reference librarians is also studied, but in this case technology is not the point of study, but a tool used to aid the investigation.

Collaboration is discussed in a number of articles, however many of these articles include collaboration as one of several topics. A wide range of tools for collaboration, both synchronous and asynchronous, have been written about. Listservs were among the first and are still be used. Desktop videoconferencing for collaboration is also reported about in two articles.

The use of data collected on the time of day use of an OPAC was analyzed to determine if reference staffing could reasonably be modified based upon the data. Finally one-on-one instruction provided on need at the reference desk is discussed in three articles. Most of the articles in this section were written in the latter part of the decade. This probably reflects the growing use of technology tools and resources by both patrons and reference librarians. It also should reflect the growth in amount of tools and resources.

Attitudes & behavior

Subramanian, Jane M. "Patron Attitudes Toward Computerized and Print Resources: Discussion and considerations for reference service." *The Reference Librarian* 60 (1998): 127-38.

Given the rapid development of electronic resources, information overload and the preset notions of patrons, it is becoming more difficult for librarians to deal with patron's needs. Automation and electronic resources are very attractive to many people, although those that have only a limited knowledge of computers seem reluctant to invest

the time to learn a system to meet an immediate information need. Librarians may have to convince those patrons that in certain circumstances electronic resources should be the resource of choice. Instruction then becomes a problem for the reference librarian. However other patrons have the opposite problem and believe that only electronic resources are worthwhile. Patrons comfortable with computers may not have competency in searching and yet may not realize their problem. Other computer-competent patrons may not realize the scope of electronic versus print resources. Again librarians must tactfully assist the patron. Librarians must attempt to teach a balanced approach to information searching with content, not format or technology is the key.

Hopkins, Alison and Jacquelyn Sapiie. "Survey of the Confidence Levels of Public Service Librarians in Using Electronic Reference Sources." *The Reference Librarian* 65 (1999): 111-23.

A rigorous survey exploring the confidence of public service librarians was conducted in the Queens Borough Public Library in 1996. The results from a carefully chosen sample of public service librarians were compared with the results from a similar sample of non-public service librarians. Six hypotheses were tested. The survey itself consisted of thirty-one questions to be ranked on a five point Likert scale. The questions covered nine types of skills: catalog; a particular database; email; FTP; Internet, personal computing; policy; gopher; telnet; and test questions. The survey was a measure of perceived ability, not demonstrated ability. It was found that there were no differences between the two groups. Both expressed the same confidence. Rank and position of the librarians and size of the branch library worked in also showed no difference. All librarians had low confidence in using the Internet. Librarians had much greater confidence using the library catalog (not mentioned whether the catalog is an OPAC only). Children's Librarians had extremely low confidence in dealing with policy questions.

Trujillo, Rosanne E. "Reference Librarians' Gender, Demeanor Important in Patron Decision Making." *Cognotes* Midwinter Issue II (1999): 2

Research on the approachability of reference librarians was presented at the RUSA/MOUSS Performance Issues for Reference and Information Service Librarian Discussion Group. Dave Tyckoson at California State University - Fresno conducted an experiment using videotapes of reference librarians and their behavior. Subjects were shown various situations, then asked to rate the librarian's approachability. Female librarians were viewed as more approachable than males. Those librarians standing, making eye contact and smiling were also more approachable.

Professional collaboration

See also

TECHNOLOGY AND CHANGE IN REFERENCE

Ladner, Sharyn, J. and Hope N. Tillman. "Using the Internet for Reference." *Online* 17 number 1 (January 1993): 45-51.

Feeney, Ann. "Internet Applications: Stumpers-L" *Computers in Libraries* 13 number 5 (May 1993): 40-42.

Ann Feeney describes the genesis of Stumpers-L. Stumpers-L is a listserv (email mailing list) that she established to create a forum for librarians to share baffling reference questions. As a library school student, she had the idea, researched to discover if there was a comparable service, decided upon the listserv's organization, sought and received Rosary College's (now Dominican University) approval and moderated the start of the listserv. The success of the listserv was immediate. Over one hundred subscriptions arrived in the first eighteen hours after advertising. Small technical problems were conquered. A "council" of advisors was created for advice and consultation. Several other changes were made, one of the most important being that the list moved form a moderated status to an unmoderated.

Balas, Janet. "Building Virtual Libraries." *Computers in Libraries* 16 number 2 (February 1996): 48-50.

The concept of the virtual library was explored by the two examples of DIGLIB and the Internet Public Library. DIGLIB was a listserv run by the International Federation of Library Associations and Institutions. It provided a communication forum for librarians. The IPL's history and organization was described. Of especial interest were the sections on reference and professional services for librarians. The reference area of the IPL provided a ready reference collection consisting of links to internet resources organized by subject. There were couple informational pages to help users and an online form to submit questions via email. A MOO was also available during posted hours. The professional services for librarians were still under development, but had a number of areas such as On-the-Job-Resources, Reviews, and Libraries & Technology. Many of these areas were cooperative in that non-IPL librarians were asked to submit information to be published.

See also

CONNECTING REFERENCE LIBRARIANS TO REMOTE USERS

Videoconferencing

Young, Jeffery R.. "Librarians Use Videoconferencing to Connect with Patrons, Colleagues." *Academe Today* (July 16, 1996):

"Virtual Service." *American Libraries* 28 number 1 (January 1997): 44-45

Folger, Kathleen M. "The Virtual Librarian: Using Desktop Videoconferencing to Provide Interactive Reference Assistance." (electronic publication http://www.ala.org/acrl/paperhtm/a09.html)

Scheduling

Banks, Julie. "Can Transaction Logs Be Used for Resource Scheduling? An Analysis." *The Reference Librarian* 63 (1999): 95-108.

A transaction log of the Kent Library's (Southeast Missouri State University) OPAC was compiled for three semesters. The log was then statistically analyzed to determine what time-usage patterns were exhibited. These findings were compared with a study at another library a decade ago. It was concluded that the patterns discovered were only general variations in nature and would therefore not be helpful in scheduling reference services. Confounding factors, such as classroom assignments, are also shortly discussed.

Instruction

Kissane, Emily C. and Daniel J. Mollner. "Critical Thinking at the Reference Desk: Teaching students to manage technology." *Reference Quarterly* 32 number 4 (Summer 1993): 485-9.

Critical thinking is identified as one of the current educational themes. Library research is posited to be an important aspect of instruction in critical thinking. Although reference librarians provide critical thinking for patrons due to their specialized knowledge, in academic situations, librarians need to externalize the critical thinking so that students can learn. Given three levels of evaluation, it is assumed that librarians teach the first, selection of information sources. However the second, evaluation of citations, and the third, evaluation of selected materials' content, are not taught. Reference librarians have concentrated on teaching about use of technology and not on use of content. The reference encounter should be viewed as a teaching encounter. Reference librarians should teach "information as the means to gain knowledge rather than an end in and of itself." The position to be adopted is that all questions except ready reference and direction should be teaching encounters.

Davidson, Jeanne R. "Computer Technology: Pandora's Box or Toolbox." *Research Strategies* 12 (Summer 1994): 182-6.

The Technology Toolbox is a collection of instructions on the use of particular computer tools such as a word processor, an email list, and an OPAC. Also included in the toolbox are sample assignments for instructors' use. A number of teaching faculty has used the Technology Toolbox as a major component for their courses. Student assistants in a campus Reading & Writing Center also provided peer tutoring. As was planned, the Toolbox has replaced some of the individual teaching done at the Reference Desk, but this function still continues. Questions about technology literacy were raised by the Toolbox. The primary ones center on the variation in entering students' skills and on who is responsible for teaching technology on campus.

See also

MISCELLANEOUS

Attitudes & behavior

Subramanian, Jane M. "Patron Attitudes Toward Computerized and Print Resources: Discussion and considerations for reference service." *The Reference Librarian* 60 (1998): 127-38.

DISCUSSION

There are several important observations that can be made about the periodic literature of the 1990's in regards to technology and its effect on reference services. The first is that there is an increasing body of literature as is shown in Table 1. Sixty-nine articles were reviewed in this project. There were many more that discussed technology in libraries. Many of these articles could have been considered to effect reference services, however the majority of these articles dealt with libraries and librarianship in general or they dealt with instruction. As was noted, instruction was only included in this study if the instruction was delivered in an impromptu, one-on-one situation at the reference desk. There were also a large number of online resource review articles. These articles were also not included since these are very similar to book or journal reviews.

The articles reviewed show that the topics of interest change over time. Articles on general change in reference services have remained relatively constant. This is the largest single category accounting for 28% of all article published. Formats of reference information had no articles published until 1994 with most of the articles published in 1997 or latter. The various formats discussed in the articles varied. The use of remote resources in reference transactions has increased somewhat over time, but in an uneven manner. Only one was published before 1994. Collection building did not become a subject on interest until lately. All but one article were published in the late 1990's. The reason for this pattern in the use of remote resources in reference transactions and digital reference collection development seems to be the relative amounts of resources available. In the early 1990's there were significantly less resources available in digital format than in the late 1990's. Connecting reference librarians to remote users is the second largest

category of articles. Most of the articles were published late in the decade. This probably reflects both the increasing availability of computers for patrons at remote sites (like work and home) and the increasing ease of use resulting from the widespread use of GUI interfaces in those computers. The patrons had to have easy and affordable access before this could be a growth area. Miscellaneous is a section holding a wide variety of subjects. After the start of the decade, relatively even levels of publication are shown.

Table 1 71 Articles published on Technology and Reference

	General Change	Formats	Remote delivery	Use of remote resources	Collection building	Connecting to remote users	Miscellaneous	Total
1990	2							2
1991			1	1		1		3
1992	3		1					4
1993	2		1			1	3	8
1994		3		3	1		1	8
1995	3			1		1		5
1996	2				1	3	2	8
1997	1	2		1	3	4	2	13
1998	3	1		2	1	1	2	10
1999	6	1		1	1	7	3	19
Total	22	7	3	9	7	18	13	79

N.B. Some articles were assigned to more than one category resulting in overcounting.

The type of article published is shown in Table 2. The six types are: survey; other research methodology; personal report; persuasive; theoretical; and historical. Survey articles are those that used a survey methodology. It is a separate category because so many surveys were done, nearly half of the research articles. The other research methodology category includes all other types of research. This includes transaction log analysis, interviewing, job advertisement analysis, case study, and search engine effectiveness analysis. The range of methodology indicates the possibilities for future analysis. Personal reports are those articles describing a particular project or approach. These articles are common, accounting for about one third of all published

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articles. More are being published now, probably reflecting the growing experience and experiment in libraries. Persuasive articles are similar to editorials. Some facts may be cited, but the tone of the article is to convince the reader of the value of a particular tool, approach or process. The theoretical articles may also be persuasive, but include more analysis or theory building rather than persuasion. Historical articles discuss the development of technology in libraries. If the historical element was the strongest part of the article, it was classified here even if there were other elements in the article. It was very difficult to assign categories to some articles.

Table 2 Types of article

	Survey	Other research methodology	Personal report	Persuasive	Theoretical	Historical
1990					2	
1991	1	1	1			
1992		1	1	1	1	
1993	1		1	1	2	
1994			4	1	3	
1995	1		1	2		1
1996		1	3		1	
1997		1	5		5	
1998	1	1	1	2	3	1
1999	2	3	4	2	6	2
Total	6	8	21	9	23	4

The theoretical are the most common, being one third of the total. The amount or articles being published are increasing over time. However the type of article being published does not seem to vary too much. There are more theoretical articles now. The historical article seems to have appeared only in the latter half of the 1990's, but these are small numbers.

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Overall, there is a healthy mixture of all types of articles. Genuine research is being conducted and reported. Individual experiences are also being shared. The profession is not neglecting theoretical constructions, although no one approach has dominated. Historical reviews are starting to appear which provides for some comparative basis, especially for the younger members of the profession.

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